

## CLAIMS

I claim:

1. A method of reducing the solubility and bioavailability of heavy metals within particulate emissions from air, wastewater and water sources, comprising contacting heavy metal particulate with at least one complexing agent in an amount effective in reducing the leaching of heavy metal from particulate and thus reducing particulate solubility and bioavailability.
2. The method of claim 1, wherein the heavy metal complexing agent is selected from the group consisting of precipitants, coagulants, buffer agents, oxidizing agents, reducing agents, magnesium oxide, calcium oxide, Portland cement, iodide, potassium iodide, carbon, activated carbon, bone char, activated alumina, aluminum sulfate, potassium permanganate, ferric chloride, ferric sulfate, sulfides, carbonates, silicates, water soluble phosphates, water insoluble phosphates, wet process amber phosphoric acid, wet process green phosphoric acid, coproduct phosphoric acid solution from aluminum polishing, technical grade phosphoric acid, hexametaphosphate, polyphosphate, calcium orthophosphate, superphosphates, triple superphosphates, phosphate fertilizers, phosphate rock, bone phosphate, monocalcium phosphate, monoammonia phosphate, diammonium phosphate, dicalcium phosphate, tricalcium phosphate, trisodium phosphate, salts of phosphoric acid, and combinations thereof.
3. The method of claim 2, wherein the salts of phosphoric acid are alkali metal salts.
4. The method of claim 2, wherein the phosphate salt is a trisodium phosphate, dicalcium phosphate, disodium hydrogen phosphate, sodium dihydrogen

phosphate, tripotassium phosphate, dipotassium hydrogen phosphate, potassium dihydrogen phosphate, trilithium phosphate, dilithium hydrogen phosphate, lithium dihydrogen phosphate or mixtures thereof.

5. The method of claim 2, wherein one phosphate is combined with an additional heavy metal complexing agent including Portland cement, calcium oxide, magnesium oxide, iron, calcium, calcium chloride, potassium chloride, sodium chloride, chlorides, aluminum, sulfates, surfactants, silicates, precipitants, coagulants, reducing agents, oxidizing agents and combinations thereof.

6. The method of claim 1, wherein the complexing agents are selected from the non-phosphate group including polymers, silicates, calcium oxide, quicklime, magnesium oxides, surfactants, calcium chloride, sodium chloride, potassium chloride, vanadium, boron, iron, aluminum, sulfates, reducing agents, oxidizing agents, flocculants, coagulants, precipitants, or combinations thereof.

7. A method of reducing the solubility and bioavailability of heavy metals within particulate emissions from air, wastewater and water sources, comprising contacting heavy metal particulate with at least one complexing agent prior to the pollution particulate control device in an amount effective in reducing the leaching of heavy metal from particulate and thus reducing particulate solubility and bioavailability.

8. The method of claim 1, wherein the heavy metal complexing agent is selected from the group consisting of precipitants, coagulants, buffer agents, oxidizing agents, reducing agents, magnesium oxide, calcium oxide, Portland cement, iodide, potassium iodide, carbon, activated carbon, bone char, activated alumina, aluminum sulfate, potassium permanganate, ferric chloride, ferric sulfate, sulfides, carbonates,

silicates, water soluble phosphates, water insoluble phosphates, wet process amber phosphoric acid, wet process green phosphoric acid, coproduct phosphoric acid solution from aluminum polishing, technical grade phosphoric acid, hexametaphosphate, polyphosphate, calcium orthophosphate, superphosphates, triple superphosphates, phosphate fertilizers, phosphate rock, bone phosphate, monocalcium phosphate, monoammonia phosphate, diammonium phosphate, dicalcium phosphate, tricalcium phosphate, trisodium phosphate, salts of phosphoric acid, and combinations thereof.

9. A method of reducing the solubility and bioavailability of heavy metals within particulate emissions from air, wastewater and water sources, comprising contacting heavy metal particulate with at least one complexing agent prior to the pollution particulate control device and at a temperature above ambient in an amount effective in reducing the leaching of heavy metal from particulate and thus reducing particulate solubility and bioavailability.